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EMULSION OF MINERAL OIL, LAURIC DIETHANOLAMIDE, AND WATER

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The present invention relates to clear oil-in-water emulsions. More particularly, the present invention relates to the methods of manufacture and to clear, transparent oil-in-water emulsions comprising mineral oil, water and linoleic acid diethanol amide.

Hair-grooming preparations in the form of emulsions of mineral oil in water are well known. These preparations have many advantages over other types of hair-grooming preparations such as the preparations comprising water in oil, brilliantines or gum bases. Illustratively, the oil-in-water preparations do not have a greasy feel or the propensity to stain clothing as do the brilliantines or water-in-oil preparations. Also, the oil-in-water preparations can produce a high luster or sheen on the hair without any stickiness whereas the gum base hair dressings do not impart luster to the hair and often leave the hair with a dried adhesive-like texture.

Although the oil-in-water emulsions possess many advantages over other types of hair preparations, they suffer from a number of defects. Thus, such preparations have one or more of the following disadvantages: they are ordinarily opaque, unstable, foam when applied to the hair, leave a white film on the hair, irritate the scalp or employ ingredients which do not aid in the care or grooming of the scalp or hair. Also, clear oil-in-water emulsions containing relatively large quantities of both mineral oil and water require quantities of an emulsifier or emulsifiers which are substantially in excess of the mineral oil component. Adding hair-grooming agents, such as lanolin alcohol, to the clear emulsions causes them to become opaque.

It is an object of this invention to provide clear and transparent liquid emulsions of oil in water, particularly those containing at least about 30 percent by weight each of oil and water.

It is another object of this invention to provide an emulsifying agent which permits the preparation of clear and transparent emulsions of oil in water.

It is a further object of this invention to provide a method of preparation of clear, transparent hair-grooming compositions and emollient body lotions.

Further objects will be apparent to those skilled in the art from reading the following description.

The objects of the present invention are achieved by utilizing linoleic acid diethanol amide as an emulsifying agent in oil-in-water emulsions. In the preferred embodiment of the invention, an amount of linoleic diethanol amide is dissolved in a greater amount by weight of mineral oil, and the resulting solution is solubilized in water.

Clear, transparent emulsions comprising substantial quantities of mineral oil in water can be produced wherein the quantity of emulsifier employed in the emulsion can be present in quantities less than that of mineral oil. The emulsions of this invention do not possess any of the above enumerated disadvantages of the prior art hair preparations. Illustratively, the emulsions of this invention are stable, non-toxic, non-irritating and aid in the removal of dandruff; they impart a thin, uniform, attractive film to the hair without greasiness, provide good moisturizing properties, do not stain clothing, and the residue which remains on the hands after application can be easily removed. Also, all the essential ingredients of the

novel emulsions serve a useful purpose in the care of the skin or hair.

The essential ingredients of the clear, transparent emulsions of this invention are mineral oil, water, and linoleic acid diethanol amide. In addition to the essential ingredients, various cosmetic or medicinal adjuvants can also be added to the clear, transparent emulsions without destroying their clarity and transparency.

The linoleic acid diethanol amide emulsifier employed in this invention is also referred to herein as the amide emulsifier. Illustrative of the amide emulsifier, there can be mentioned linoleic acid diethanol amide-containing amides, including safflower oil acid diethanol amide, sunflower oil acid diethanol amide, soybean oil acid diethanol amide, cottonseed oil acid diethanol amide, corn oil acid diethanol amide and sesame oil acid diethanol amide. These mixed fatty acid amides are desirably prepared from oils sufficiently rich in linoleic acid to constitute at least about 40% of the oil. Where mixed fatty acid amides are prepared from oils containing less linoleic acid, such as peanut oil which may contain about 22% linoleic acid, larger amounts of mixed fatty acid amide should be employed. The amide emulsifier aids in the formation of the emulsion structure and is a good hair conditioner

The amide emulsifier is preferably formed from the reaction of one mole of diethanol amine with one mole of linoleic acid or its methyl ester or glyceride. The amide may also be formed in the presence of excess amine.

Soybean, safflower, sunflower, corn, cottonseed and sesame oils, containing at least about 40% linoleic acid may be reacted with the diethanol amine to form the amide emulsifier of the invention. Soybean, safflower and sunflower oils contain from about 49 to 79% of linoleic acid esters, and it is the linoleic component of these oils and the other aforementioned oils which causes them to be effective in forming the emulsifying agents. Substantially pure linoleic acid diethanol amide is preferred.

Linoleic diethanol amide has proved to be superior to diethanol amide derivatives of some other closely related fatty acids in mineral oil-in-water systems.

The novel result obtained is that a clear and transparent emulsion results rather than the opaque emulsion usually obtained. The emulsion formed is unique not only in that it is clear and transparent but also in that large amounts of oil, such as at least about 30 percent by weight, can be solubilized in water to produce a clear liquid while using a relatively small amount of the emulsifier.

Since this is an oil-in-water system, the amide emulsifier used must be soluble in the oil used. The amide emulsifier must readily dissolve in the oil, and the resulting solution must readily emulsify upon stirring with water. Elevated temperature is not essential to the production of a clear emulsion. However, heating up to about 150° F. shortens the stirring time required.

The oil used is preferably mineral oil. The mineral oil must be present in an amount greater than 30 percent by weight of the final clear emulsion. Similarly, water must also be present in an amount greater than 30 percent by weight of the final emulsion. The amide emulsifier must be present in an amount less than the amount by weight of the mineral oil. The preferred range of the amide emulsifier is from ½ to ¾ of the amount by weight of the mineral oil present. Desirably, the amide emulsifier should comprise at least about 5% of the final composition.

Mineral oil is also known as liquid petrolatum or white mineral oil. The preparation and properties of mineral oil can be found on pages 514 to 515 of Remington's Practice of Pharmacy, 10th edition. The mineral oil component preferably contains the lighter mineral oils. The mineral oil component may be partially replaced up to

about 10% by weight of the total composition by certain selected esters and materials, for instance, liquid lanolin esters, isopropyl myristate, isopropyl palmitate, isocetyl stearate and acetylated lanolin alcohols (Acetulan), without sacrificing clarity or transparency. Other somewhat related materials, such as glycerine, castor oil, beeswax, silicones, and lanolin were found to be unsatisfactory for substitution of part of the mineral oil.

Liquid lanolin esters are a well-known material which represent an ester fraction of lanolin. A description and typical composition of liquid lanolin esters can be found on page 152 of Sagarin, Cosmetics, Science and Technology (1957). Liquid lanolin esters are an excellent emollient, aid in the formation of a thin, even film of the emulsion, and are good moisturizing agents.

In addition to the hair-grooming utility, the clear emulsions of this invention can be used as cosmetics in a manner similar to emollient body lotions.

A suitable formulation for a hair-grooming composition should contain at least 30 percent by weight of each of the water and mineral oil and less amide emulsifier than the amount of oil used. A preferred hair-grooming composition is as follows:

Example I

	Percent by weight
Mineral oil	40
Water	40
Linoleic acid diethanol amide	20

Another desirable hair-grooming composition is as follows:

Example II

	Percent by weight
Mineral oil	40
Water	30
Peanut oil acid diethanol amide (containing approximately 22% linoleic acid)	30

Other suitable compositions in accordance with the invention are illustrated by the four examples which follow:

Example III

	Percent by weight
Light mineral oil	30
Isocetyl stearate	10
Linoleic diethanol amide	20
Water	40

Example IV

Light mineral oil	30
Linoleic diethanol amide	20
Water	50

Example V

Light mineral oil	30
Safflower oil	10
Linoleic diethanol amide	20
Water	40

Example VI

Light mineral oil	30
Isopropyl palmitate	10
Linoleic diethanol amide	30
Water	30

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. A clear, transparent, oil-in-water emulsion containing at least 30 percent by weight each of water and mineral oil and containing an amide emulsifier in an amount by weight equal to from about 0.5 to 0.75 times the amount of the mineral oil present, said amide emulsifier being linoleic acid diethanol amide.

2. A composition as in claim 1 wherein said mineral oil contains up to 10 percent by weight of at least one member selected from the class consisting of liquid lanolin esters, acetylated lanolin alcohols, isopropyl palmitate, isocetyl stearate and isopropyl myristate.

3. A clear, transparent hair-grooming composition comprising an oil-in-water emulsion containing about 40 percent by weight of water, about 40 percent by weight of mineral oil, and about 20 percent by weight of linoleic acid diethanol amide.

4. The method of preparing a clear, transparent oil-in-water emulsion composition comprising mixing linoleic acid diethanol amide with mineral oil in an amount by weight greater than that of the amide employed, and adding sufficient water so that the water and the mineral oil each comprise at least 30 percent by weight of the final composition and the linoleic acid diethanol amide is present in the final composition in an amount equal to 0.5 to 0.75 times the amount of mineral oil present, and continuing the mixing to form a clear, transparent oil-in-water emulsion.

5. A method as in claim 4 wherein the alkanolamine moiety of the alkanolamide is present in excess of the stoichiometric quantity of linoleic acid.

6. A method according to claim 4 wherein the mixture containing the components is heated with stirring.

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